

Patent Application of
Kenneth Johnson
for

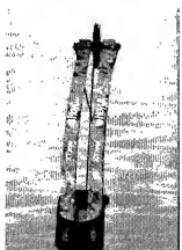
PORTABLE BOW PRESS FOR COMPOUND BOWS
WITH EITHER TWO PIECE LIMBS OR ONE PIECE LIMBS

Background of Invention

This invention relates generally to the sport of archery, and more specifically to compound bows. The invention is a portable bow press which allows an archer to relieve the tension on the limbs, string and cables of high powered compound bow having either two piece limbs or one piece limbs with greater ease and safety for the archer, and less risk of damage to the bow's limbs and riser.

Prior Art

Paff, US Patent 5,125,389 discloses a tensioning apparatus for tensioning of the limbs of a compound bow with one piece limbs. Thus enabling the removal and replacement of the compound bow's string and cables. This apparatus uses the same or similar means of connecting to the bow's limbs as Rezmer, US Patent, 4,599,987 and Egusquiza, US Patent, 5,425,350, and Gissel, US Patent, 5,746,192. They use a "T" shaped end, a loop and pin arrangement, or a cord or cable arrangement, that is attached inside the cam groove, at the closed end of single piece bow limb's. Rezmer's figure 3. shows how the above limb attachments uses the closed end of the cam groove to keep the attachments from sliding toward the bow's riser. Because this type of attachment uses the closed end of the cam groove to prevent the attachment from sliding toward the riser of the bow, none of the devices listed above can be used to repair compound bows having two piece limbs. The first photo below shows a two piece bow limb. These devices are limited to compound bows with one piece limbs. The second photo below shows a one piece bow limb. Two piece limbs having cam grooves that extends to the riser, require a tensioning device with a means of attachment different from those described above.



Two Piece Bow Limb



One Piece Bow Limb

All the devices listed above except Egusquiza's device are described as being limited to assisting in replacing bow strings and cables. They are not capable of assisting in the complete assembly, and disassembly of a compound bow. This is because their adjustment device is limited in travel.

Gissel's device, must use the compound bow's string to tensioning the bow's limbs. Gissel's device is the most limited because it is unable to be used for the maintenance of a compound bow with a broken string.

The limb of a compound bow is made tapered. Being thicker at the riser and thinner at the outer end. Therefore, the greatest flex is at the outer most portion of the limb. All of the devices listed above apply force a distance away from the outer end of the bow limb. They apply force inside the bow, between the bow's cam and its riser. See fig. 1 of Paff's US Patent. Here the limb is thicker and less flexible. None take advantage of the flex at the outer most portion of the bow's limb. None of the above devices flex the entire length of the bow's limb.

Because these devices apply pressure to the thicker section of the bow's limb they must apply additional force to flex the limbs. This adds to the risk of damaging the bow's riser and the limbs, especially when maintaining high powered bows. These devices also require stronger and heavier components to apply the additional force needed to flex the bow's limbs at this inside position. Thus making these devices over weight and more costly.

Paff, US Patent 5,125,389 and Rezmer, US Patent, 4,599,987 and Egusquiza, US Patent, 5,425,350, and Gissel, US Patent, 5,746,192, require that the archer attach the device between the bow's string and the bow's riser. Paff's fig.1 show this attachment. This is a confined area, making it difficult to operate the adjusting device. Such positioning also increases the risk of the archer being injured while using these devices. If a string or cable would break while the archer is operating these devices, the archer could be injured.

Steven, US Patent 5,022,377 titled Portable Bow Press is the largest of the portable devices listed. Its design uses an adjusting device that pushes or extends to tension the limbs. This type of adjusting device must be made many times stronger than a pulling or contracting adjusting device. Compound bows are sold in lengths up to forty eight inches, and have draw weights of up to one hundred and twenty pounds. For Steven's device to be useful on these high powered compound bows, it would have to be greatly reinforced. Such reinforcement would make it heavy and expensive.

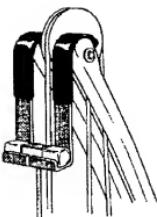
Steven's device requires more pressure to force the limbs of a compound bow inward than the devices discussed earlier. The points at which the force is applied to the bow limbs is even closer to the riser where the bow limbs are thicker. Steven's device, like all the devices mentioned earlier, is also unable to flex the entire length of the bow's limbs.

Steven's device also applies all the force of its adjusting device to the center of the bow's riser. Applying force to the bow's riser at its center, combined with the position at which the force is applied to the limbs, there is a high probability of damaging the riser and the limbs. This risk is increased when maintaining high powered bows.

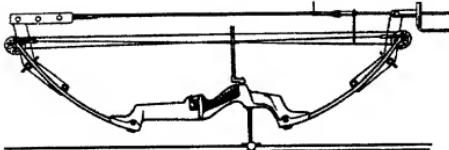
Two other devices need to be added to this prior art. Neither of these devices were found during the patent search.

The Bowmaster Portable Bow Press Quad Bracket is shown in the following picture taken from Archery Center International Plus's 2001 catalog, page 349. This device is an adapter for Rezmer, US Patent, 4,599,987 and Egusquiza, US Patent, 5,425,350, and Gissel, US Patent, 5,746,192 devices. It adapts the listed devices to two piece bow limbs. As the picture shows it attaches to the end of the two piece limb and hangs next to or on top of the bow string. As described by Bowmaster, in the case of bows with large cams, the bracket is hung between the string and the cables. Either position would cause difficulty for the archer since there is no space to operate the adjusting device. This bracket also risks damaging the string and cables by rubbing or pressing against them.

Bowmaster brackets also have curved upper ends which cannot mate with limb having square or flared ends. This limits the brackets usefulness.



Bowmaster Quad Bracket



Cardoza Handi-bow Press

The Cardoza Handi-bow Press is shown in the preceding picture taken from Archery Center International Plus's 2001 catalog, page 349. This bow press is attached to the bow's limb in the same area as the devices of Rezmer, US Patent, 4,599,987 and Egusquiza, US Patent, 5,425,350, and Gissel, US Patent, 5,746,192. Therefore it cannot flex the entire bow limb. Positioned thus, additional force is required to flex the limbs the distance needed to relax the bow string enough to allow its removal. This additional force risks over stressing the bow's limbs.

The length of the brackets (b) between where they contact the bow limb and the adjustment device, combined with the mounting of the brackets on the side of the bow, requires the brackets to be reinforced. This increases the weight and the cost of Cardoza's bow press. This structure also makes Cardoza's press unsuitable for pressing high powered bows.

Being positioned on the side of the bow can cause Cardoza's press to apply force off center, twisting the limbs and damaging both the bow's limbs and riser. This problem would be exaggerated when pressing high powered bows. A full assessment of Cardoza's press is difficult given no patent has been published at this date.

There is a need in the archery art for a inexpensive light weight portable compound bow press that allows an archer to disassemble and assemble high powered compound without over stressing the bows limbs or damaging the bow's riser. There is a need for a portable compound bow press that provides easier use and greater safety. There is a need for a compound bow press that applies force to the outer end of the compound bow's limbs, thus flexing the entire length of the bow's limbs. There is a need for a compound bow press that uses the minimum amount of force to flex the bows limbs. There is a need for a compound bow press that can press bows with either two piece limbs or one piece limbs without risking damage to the bows string or cables. There is a need for a portable bow press that can press bows with either two piece limbs or one piece limbs without the use of special adapters that are limited to bows having limbs with rounded ends.

Objects and Advantages

Several objects and advantages of my invention are;

- (a) to provide a portable bow press capable of assisting in the disassembly and assembly of compound bows with either two piece limbs or single piece limbs.
- (b) to provide a portable bow press that flexes the entire length of the bow's limbs.
- (c) to provide a portable bow press that is easier to use.
- (d) to provide an inexpensive portable bow press.
- (e) to provide a light weight portable bow press.
- (f) to provide a portable bow press that provides a greater safety for the archer.
- (g) to provide a bow press that reduces the stress on the compound bow's riser and limbs.

(h) to provide a portable bow press that is capable of assisting in the disassembly, assembly of high powered compound bows.

Further objects and advantages will become apparent from a consideration of the ensuing description and drawings.

Numerical Reference to Drawings

2 Compound bow with two piece limbs	4 Portable bow press of this invention
8 Second two piece bow limb	6 First two piece bow limb
10 Riser	12 First extending member
14 Second extending member	16 Adjusting device, which includes necessary linkage
20 First removable engagement device	21 Second removable engagement device
22 Work space between adjusting device, and bow string and cables	24 Portion of first extending member that provides mechanical advantage.
25 Portion of second extending member that provides mechanical advantage.	26 Outer end of first two piece bow limb
27 Outer end of second two piece bow limb	28 Bow string and cables
30 Central position for adjustable connection of first extending member to first end of adjusting device	32 Central position for adjustable connection of second extending member and second end of adjusting device
34 Aligning device to aid in aligning first extending member with outer end of first two piece bow limb	36 Aligning device to aid in aligning second extending member with outer end of second two piece bow limb

Description of drawings

Fig. 1 shows an isometric view of a portable bow press of this invention 4 attached to a compound bow having two piece limbs 2. Compound bow 2 having first two piece limb 6 and the second two piece limb 8, and riser 10. The compound bow press 4 consisting of first extending member 12, second extending member 14, adjusting device 16, first removable engagement device 20, second removable engagement device 21, first aligning device 34 and second aligning device 36. Extending members are made of a ridged material. Extending member 12 is engaged with the end portion of bow limb 6, using removable engagement device 20 and aligning device 34. Extending member 14 is engaged with the end portion of bow limb 8, using removable engagement device 21 and aligning device 36. Extending member 12 extends beyond the outer end 26 of limb 6. Extending member 14 extends beyond the outer end 27 of limb 8. The engagement of the extending members 12 and 14 are such that, the end portion of first limb 6 cooperates with the first extending member 12 and first removable engagement device 20. The end portion of second limb 8, cooperates with the second extending member 14 and removable engagement device 21. Adjusting device 16 is adjustably connected to the first extending member 12 at a central position 30, near the

outer edge of the extending member 12. The second end of adjusting device 16 is adjustably connected at a central position 32 near the outer edge of the second extending member 14. Thus providing a working space 22 between bow string and cables 28, and the adjustable device 16. Adjusting device 16 is positioned on the outside of the compound bow 2. Working space 22 and the positioning of adjusting device 16 on the outside of compound bow 2, provides a means for easy and safe operation of the adjusting device 16.

Fig 2. show the side view of fig.1. When the adjusting device 16 is shortened, extending members 12 and 14 are forced inward toward each other. The removable engagement device 20 engages bow limb 6 holding extending member 12 in place. The removable engagement devices 21 engages bow limb 8 holding extending member 14 in place. The extending members 14 pivots on outer end 27, and applies an inward force at outer end 27. The force at outer end 27 causing the limb 8 to flex inward over its entire length. The extending members 12 pivots on outer end 26, and applies an inward force at outer end 26. The force at outer end 26 causes limb 6 to flex inward over its entire length. The stress on the limbs 6 and 8 is reduced to a minimum. No part of the bow press of this invention 4 is in contact with the riser 10, thus preventing damage to riser 10. By flexing the entire length of the limbs 6 and 8, less force is needed to move bow limbs 6 and 8 inward the distance needed to remove the bow string and cables 28.

Adjusting device 16 being attached at central positions 30 and 32, causes the inward force to be applied equally on both halves of the two piece limbs 6 and 8. Thus preventing any twisting of the bow's limbs.

The distances 24 and 25 creates a mechanical advantage that reduces the stress on adjusting device 16. The flexing of bow limbs 6 and 8 over their entire length, and the mechanical advantage provided by the distance 24 and 25 allows for the safe use of a light weight adjusting device 16. Thus reducing the weight and cost of this invention. The combination of flexing the bow limbs 6 and 8 over their entire length, and the mechanical advantage provided by the distances 24 and 25 also allows for the pressing of high powered bows with the light weight portable device of this invention.

Space 22 allows for the use of more varied adjusting devices 16. The adjustable device 16 can be any of the common linear adjusting devices such as a toggle bolt; (see Egusquiza's device) a screw, nut; (see Cardoza Handi-bow Press) or ratchet tie down.

A ratchet tie down is an adjusting device that would not require linkage. A toggle or a screw and nut, are adjusting devices that could require linkage. The linkage may not be adjustable depending on the adjustment length of these devices. The linkage should have a means of varying its length, if the adjustment length of the adjustable device can not accommodate the different lengths of compound bows used by archers.

The removable engagement devices 20 and 21 in fig. 1 and fig. 2 are shown as removable pins. A cincture made of a belt or other material is another means of engagement.

Fig. 3 shows the inside view of limb 6, and extending member 12. Alignment device 34, and engagement device 20 are shown cooperating with the end portion of limb 6. Engagement device 20 is shown as a cincture belt. This is another means of the extending member engaging the limb.

Fig 4 shows the inside view of limb 8, and extending member 14. Alignment device 36, and engagement device 21 are shown cooperating with the end portion of limb 8. Engagement device 21 is shown again as a cincture belt.

Although the description above contains many specifications, these should not be construed as limiting the scope of the invention, but as merely providing illustrations of some of the present preferred embodiments of the invention.

Summary, Ramifications and Scope

The bow press of this invention is unlike any other bow press in its use of extending members to apply force to the ends of the limbs of a compound bow. Force applied in this way will flex the entire length of a compound bow's limbs, reducing the force needed to flex the limbs. Thus reducing the possibility of over stressing the bow's limbs or damaging the bow's riser.

The mechanical advantage the extending members provides, reduces the force on the adjusting device allowing for the use of a lighter weight and less expensive adjusting device.

The mechanical advantage, combined with flexing the bow limbs over their entire length, allows for the maintenance of high powered bows with the light weight portable bow press of this invention.

The extending members of this invention do not need the closed end of the cam groove of a one piece bow limb to help it engage and cooperate with the outer end of the bow's limb. Therefore they can be used to press compound bows with either two piece limbs or one piece limbs.

The extending members also position the adjusting device outside the compound bow for easier and safer operation.

Positioned outside the compound bow, the adjusting device can have greater travel, enabling it to adjust outward far enough to eliminate all the flex of the compound bow's limbs. Thus, allowing for the complete assembly and disassembly of compound bows.

The inexpensive, light weight, portable bow press of this invention can be easily and safely used to completely disassemble and assemble high powered compound bows with either two piece limbs or one piece limbs without over stressing the bow's limbs, or damaging the bow's riser.